Bellwork: 2/5/13

Factor the following expression:

$3x^3-42x^2+144x$

$3x(x^2-14x+48)$

$3x(x-8)(x-6)$

48

$(x^2-6x)-8x+48)$

$x(x-6)-8(x-6)$

$3x(x-6)(x-8)$

Unit 3: Chapter 5 - Polynomial Functions

What is a polynomial function?

a function with more than one term

examples:

x^2+7x+6

$2x-4$

$3x^3-4x^2+7x-5$

$-9x^6-5x^5+4x^3-7x^2+6$

Standard Form of a Polynomial: highest exponent to the lowest exponent (combine like terms if possible)

Write each polynomial in standard form. Determine the degree of the polynomial.

highest exponent

a) $3x^3-x+5x^4$

b) $4x-6x^2+x^4+10x^2-12$

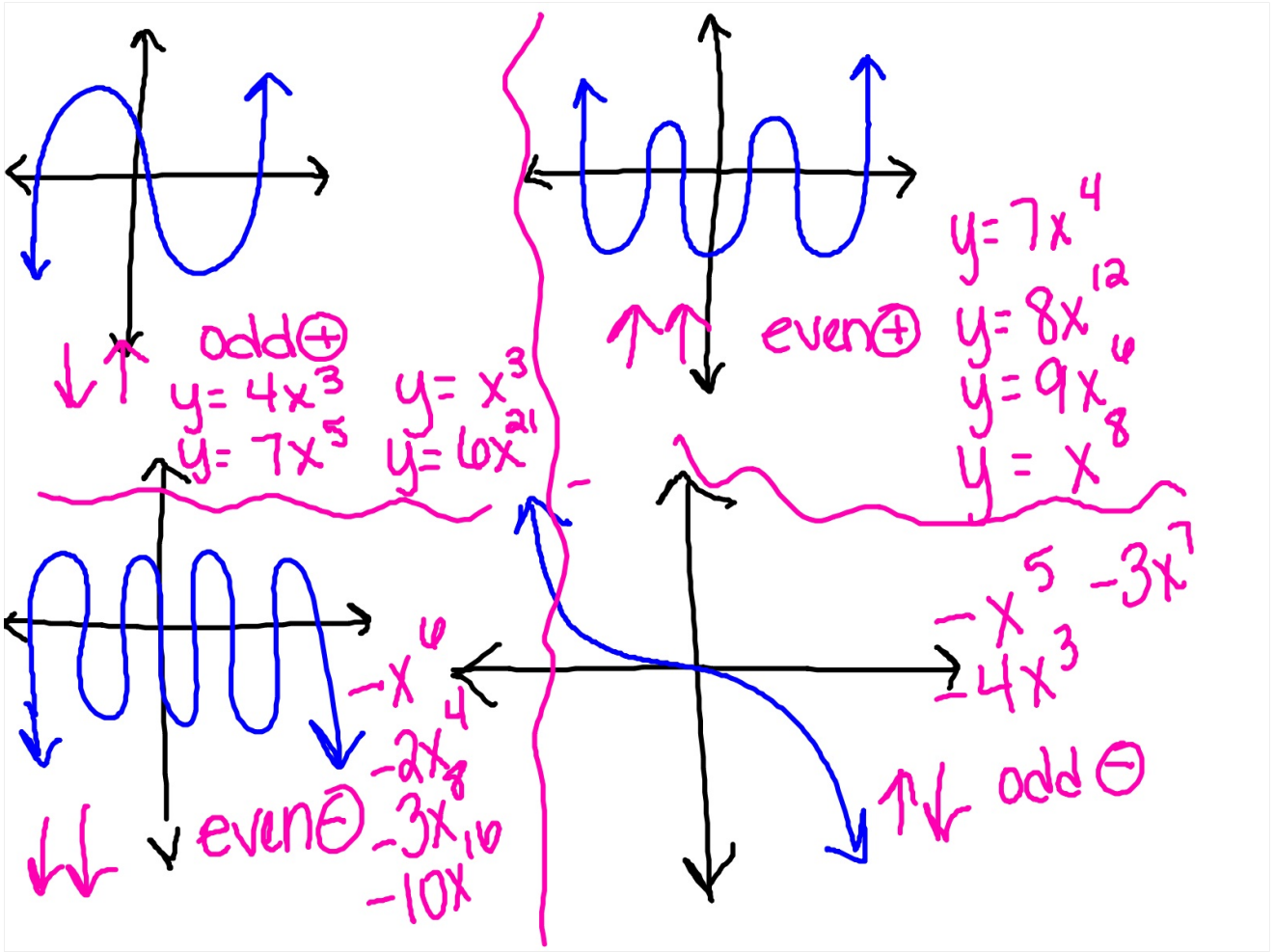
$4x+4x^2+x^4-12$

SF: $5x^4+3x^3-x$

Degree: 4

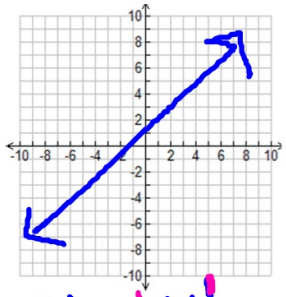
SF: $x^4+4x^2+4x-12$

Degree: 4



The degree of a polynomial function affects the shape of the graph. It determines the maximum number of turning points (u-turns) and the end behavior (the direction of the graph to the left and right)

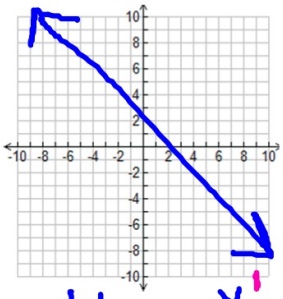
There are 4 types of end behavior:



$y = 1x^1$

odd ⊕

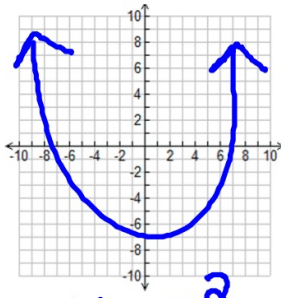
↓↑



$y = -x^1$

odd ⊖

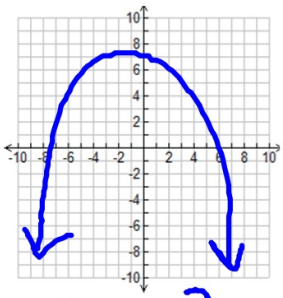
↑↓



$y = x^2$

even ⊕

↑↑



$y = -x^2$

even ⊖

↓↓

End Behavior Chart:

	even degree	odd degree
⊕ leading coeff.	↑↑	↓↑
⊖ leading coeff.	↓↓	↑↓

Determine the end behavior of each polynomial function:

c) $y = -7x^3 + 3x^2 - 15$

odd ⊖

left: ↑ right: ↓

d) $y = 6x^4 + 5x^2 + 1$

even ⊕

left: ↑ right: ↑

e) $y = -3x^2 + 7x + 4x^2 - 5$

$y = x^2 + 7x - 5$

even ⊕

left: ↑ right: ↑

f) $y = -x^7 + 6x^3 + 4x^7 + 2x$

$= 3x^7 + 6x^3 + 2x$

odd ⊕

left: ↓ right: ↑

Turning Points: (U-turns) degree − 1

Determine the possible number of turning points for each graph:

g) $x^3 + 4x^2 - x + 7$

degree: 3

odd ⊕

u-turns: 2

h) $x^7 + 4x^8 - x^6 + 5x^3$

$4x^8 + x^7 - x^6 + 5x^3$

degree: 8

even ⊕ ↑↑

u-turns: 7

i) ~~x^4~~ $+ 3x^2 + x^3 -$ ~~x^4~~

$x^3 + 3x^2$

degree: 3

u-turns: 2

j) $2x^2(3x^3 + 3x^1 - 7)$

$6x^5 + 6x^3 - 14x^2$

degree: 5

u-turns: 4

Homework: pg 285 #8-30 evens